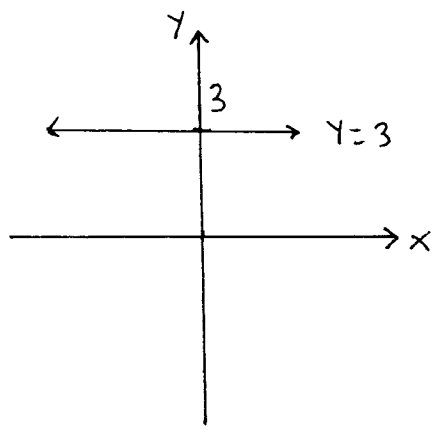
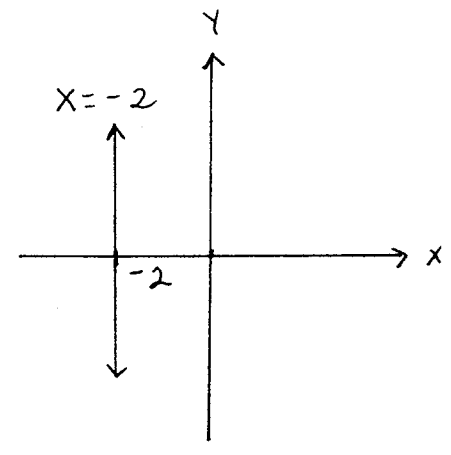


ESP  
 Kouba  
 Worksheet 1 Solutions

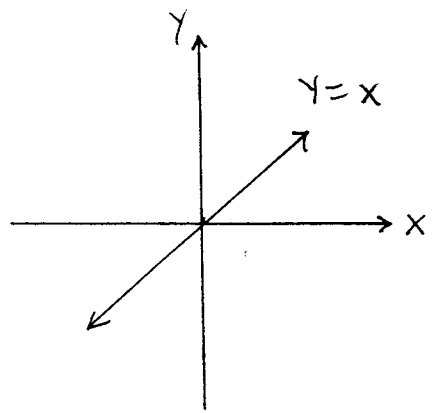
1.) a.)



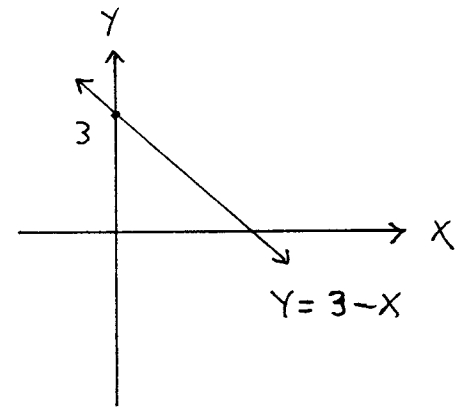
b.)



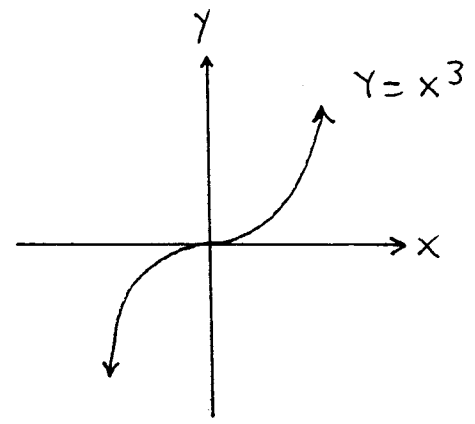
c.)



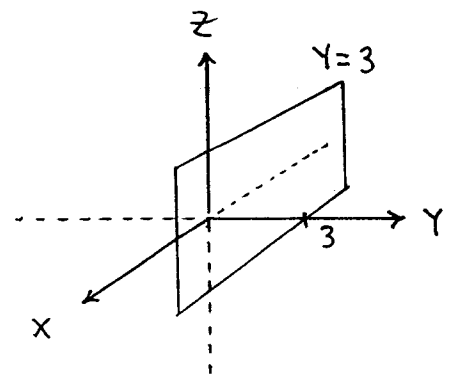
d.)



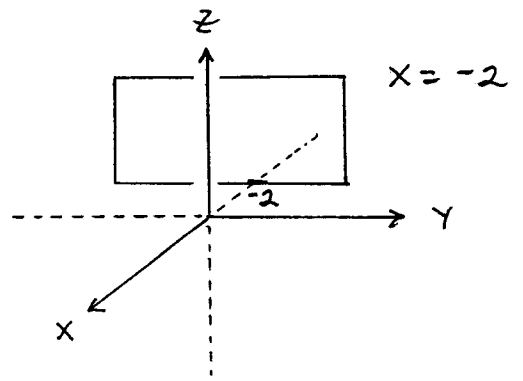
e.)



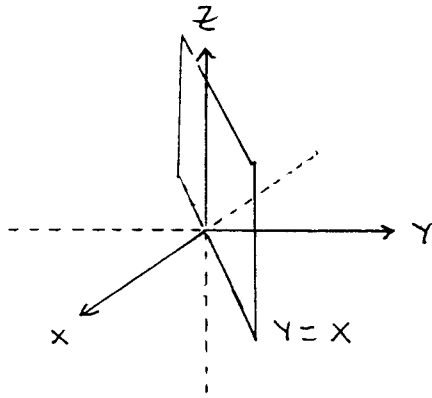
2.) a.)



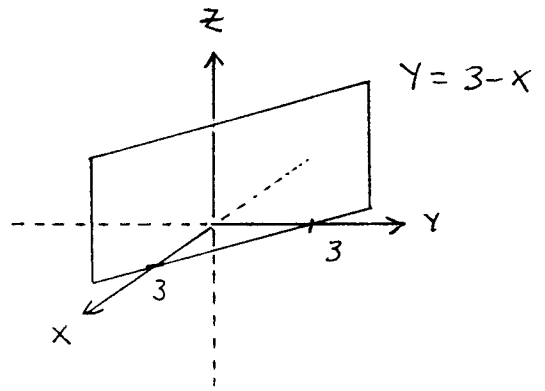
b.)



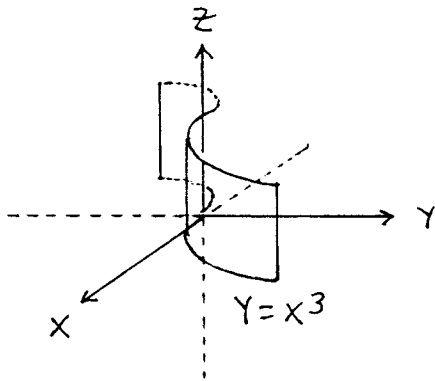
c.)



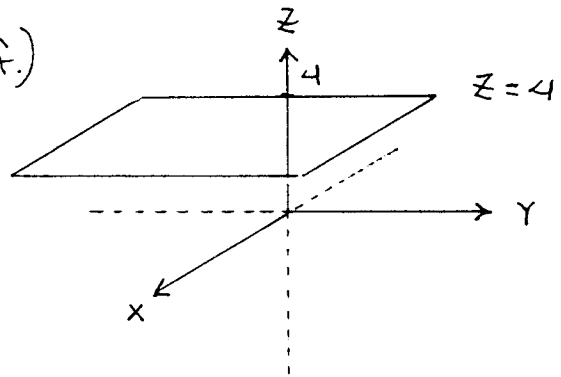
d.)



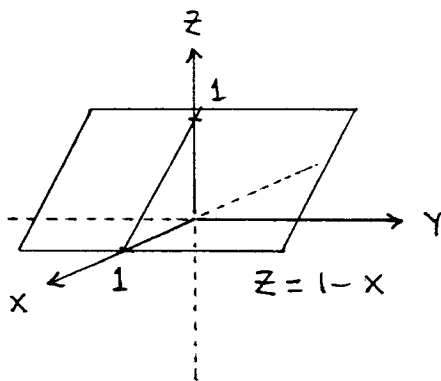
e.)



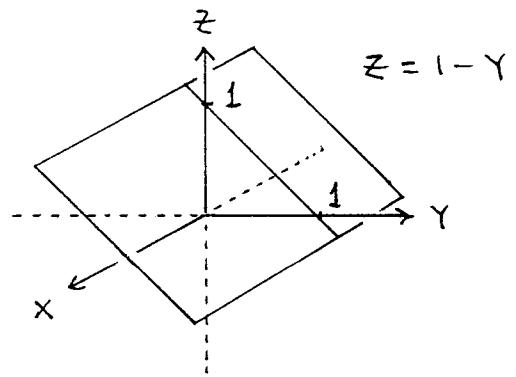
f.)



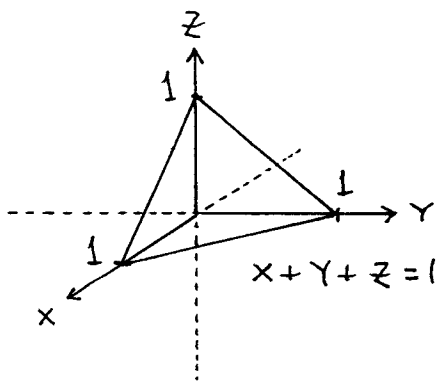
g.)



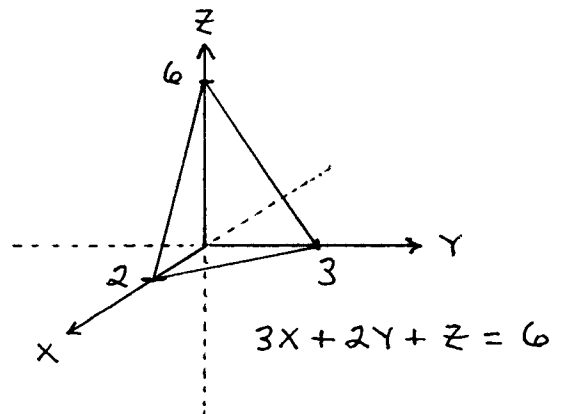
h.)

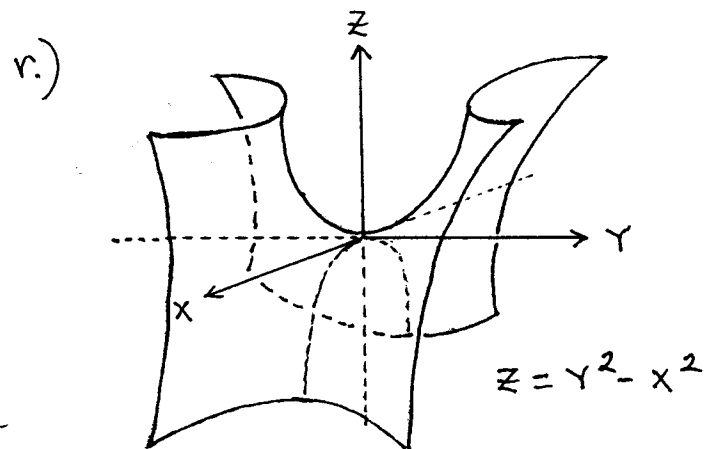
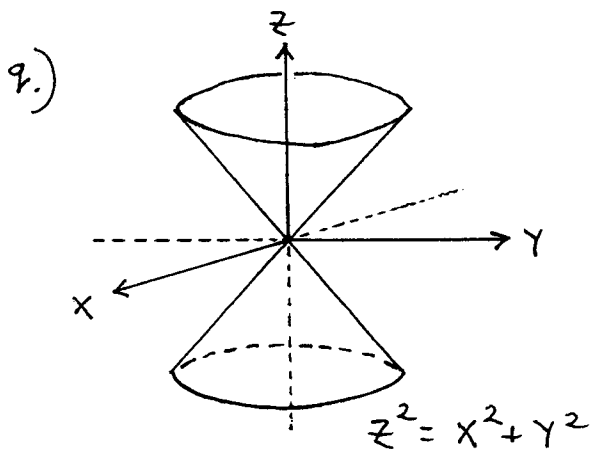
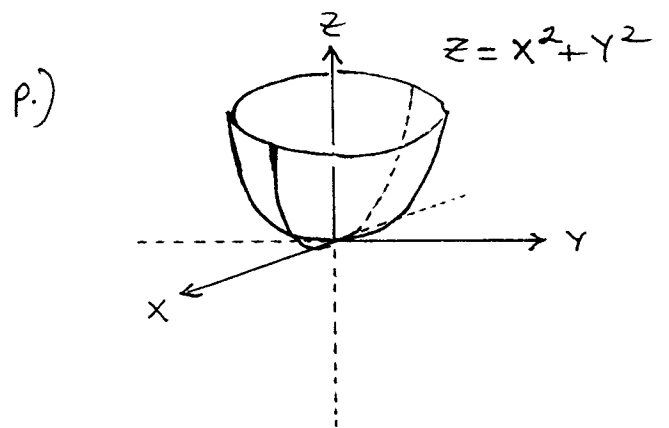
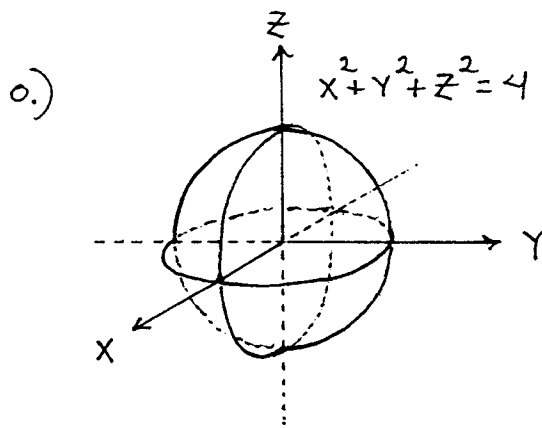
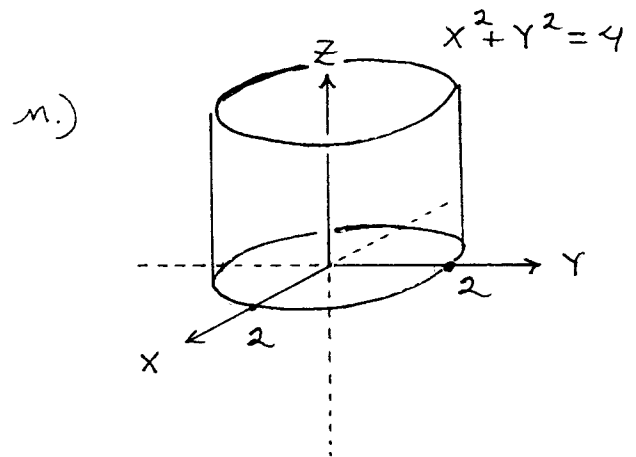
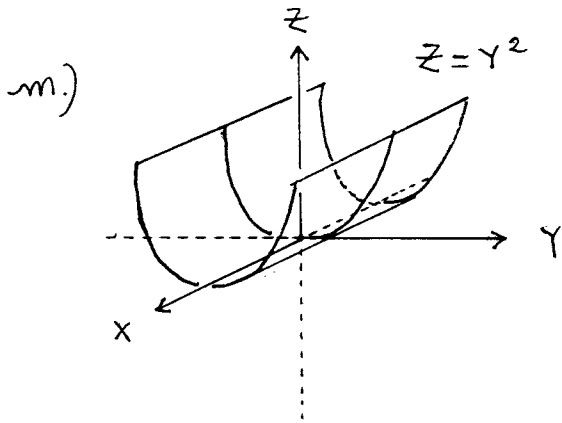
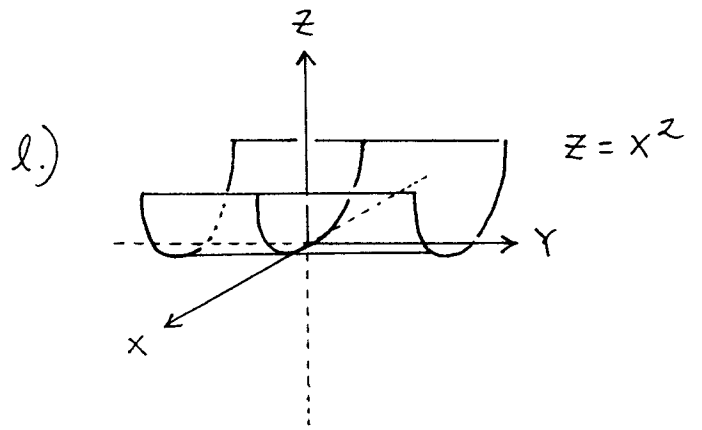
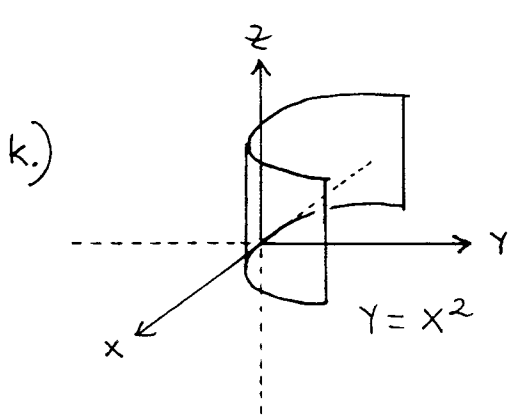


i.)



j.)





3.) a.) center :  $(0, \frac{1}{2}, -7)$  , radius :  $\frac{2}{3}$

b.)  $(x^2 - x + \frac{1}{4}) + (y^2 - \frac{1}{2}y + \frac{1}{16}) + (z^2 + 2z + 1) = 0 + \frac{1}{4} + \frac{1}{16} + 1$

$(x - \frac{1}{2})^2 + (y - \frac{1}{4})^2 + (z + 1)^2 = \frac{21}{16}$  so

center :  $(\frac{1}{2}, \frac{1}{4}, -1)$  , radius :  $\frac{\sqrt{21}}{4}$

c.)  $(x-1)^2 + (y^2 - 2y + 1) + (z-3)^2 = 1 + 1$

$(x-1)^2 + (y-1)^2 + (z-3)^2 = 2$  so

center :  $(1, 1, 3)$  , radius =  $\sqrt{2}$

4.) Distance between  $(0, 1, -1)$  and  $(4, -3, \frac{1}{2})$  is

$D = \sqrt{4^2 + 4^2 + (\frac{3}{2})^2} = \frac{\sqrt{137}}{2}$  and radius

is therefore  $\frac{1}{2} \cdot \frac{\sqrt{137}}{2} = \frac{\sqrt{137}}{4}$  ; then center

is  $(\frac{0+4}{2}, \frac{1-3}{2}, \frac{-1+\frac{1}{2}}{2}) = (2, -1, \frac{-1}{4})$  so sphere is

$(x-2)^2 + (y+1)^2 + (z+\frac{1}{4})^2 = \frac{137}{16}$

5.)

